XM-3020/3020S

SERVICE MANUAL

US Model
Canadian Model
XM-3020

AEP Model
UK Model
E Model
XM-3020S

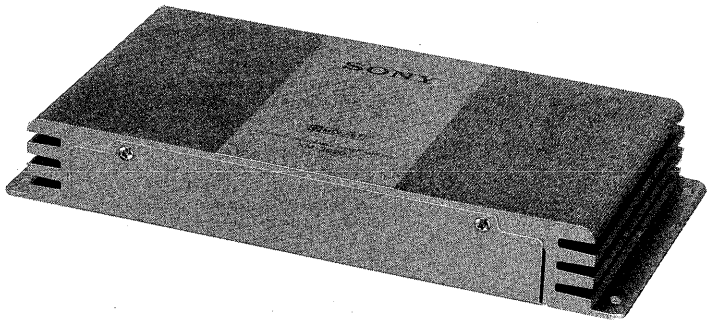


Photo: XM-3020

SPECIFICATIONS

AUDIO POWER SPECIFICATIONS

POWER OUTPUT AND TOTAL HARMONIC DISTORTION 30 watts per channel minimum continuous average power into 4 ohms, both channels driven from 20 – 20,000 Hz with no more than 0.04 % total harmonic distortion per Car Stereo Ad Hoc Committee standards.

Other specifications

Power supply system
Pulse power supply circuit
Input Car stereo input (phono jack)
High level input cord (XM-3020S)
Outputs Speaker output leads
Speaker impedance
2 – 8 ohms
4 – 8 ohms*
Maximum power output
60 watts per channel minimum RMS at 4 ohms
160 watts* (monaural) at 4 ohms
Rated outputs 30 watts per channel (20 Hz – 20 kHz, 0.04 % THD) at 4 ohms
70 watts* (20 Hz – 20 kHz, 0.5 % THD) at 4 ohms
Frequency response
8 Hz – 100 kHz $^{+0}_{-3}$ dB
Harmonic distortion
0.005 %
* When used as a bridging amplifier

Input level adjustment range
0.1 – 2 V
1 – 15 V (speaker input) (XM-3020S)
Power requirements
12 V DC car battery (negative ground)
Current drain 8 A (at rated output)
Input remote current
5 mA
Dimensions Approx. 227 × 36 × 120 mm (w/h/d)
(9 × 17/16 × 43/4 inches)
Weight Approx. 1.3 kg (2 lb 14 oz.)
Supplied accessories
Mounting screws (4)
Power connecting cord (1 set)

Design and specifications subject to change without notice.

使用時は添付資料も参照のこと
Refer to the additional documents.

STEREO POWER AMPLIFIER

SONY®

Precautions

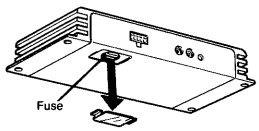
- This unit is designed for negative ground 12 V DC operation only.
- The nameplate indicating operating voltage, etc. is located on the bottom exterior.
- Use speakers with an impedance of 2 to 8 ohms. (4 – 8 ohms when used as a bridging amplifier)
- Avoid installing the unit where:
  — It would be subject to high temperatures, such as from direct sunlight or hot air from the heater.
  — It would be exposed to rain or moisture.
  — It would be subject to dust or dirt.
- If your car is parked in direct sunlight and there is a considerable rise in temperature inside the car, allow the unit to cool off before operating.
- When installing the unit horizontally, be sure not to cover the fins with the floor carpet and so on.
- If this unit is placed too close to the car radio, an interference may occur. In this case, separate the amplifier from the car radio.
- If no power is being supplied to the cassette player or tuner, check the connections.
- This power amplifier employs a protection circuit* to protect the transistors and speakers if the amplifier malfunctions. Do not attempt to test the protection circuits by covering the heat sink or connecting improper leads.
- Do not use the unit on a weak battery as its optimum performance depends on the good power supply.
- For the safety reasons, keep the volume of your car audio moderate so that you can still hear the sound outside your car.

If you have any questions or problems concerning your unit that are not covered in this manual, please consult your nearest Sony dealer.

Fuse Replacement

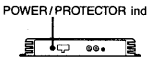
If the fuse blows, check the power connection and replace the fuse. If the fuse blows again after replacement, there may be an internal malfunction. In this case, consult your nearest Sony dealer.

Warning
Use the specified ampere fuse.
Use of a higher amperage fuse may cause serious damage.



Remove the protective plastic sheet and pull out the fuse.

* **Protection circuit**
This amplifier is provided with a protection circuit which operates in the following cases when:
— the unit is overheated
— a DC current is generated
— the speaker terminals are short circuited.
The color of the POWER/PROTECTOR indicator changes from green to red and the unit will shut down. If this happens, turn off the connected equipment and take out the cassette tape or disc and determine the cause of the malfunction. If the amplifier has overheated, wait until the unit cools off.



Précautions

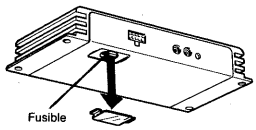
- Cet appareil est conçu pour fonctionner uniquement sur courant continu de 12 V avec masse négative.
- La plaque indiquant la tension de fonctionnement, etc. se trouve à l'extérieur, sur le fond.
- Utiliser des haut-parleurs à impédance de 2 à 8 ohms. (4 à 8 ohms lors de l'utilisation comme amplificateur de dérivation)
- Ne pas exposer l'appareil:
  — à des températures élevées, comme les rayons directs du soleil, l'air du chauffage.
  — à l'humidité ou à la pluie.
  — à la poussière ou à la saleté.
- Si la voiture est garée en pein soleil, et s'il y a forte augmentation de la température à l'intérieur, laisser refroidir l'appareil avant de l'utiliser.
- Lors d'une installation horizontale, veiller à ne pas couvrir les ailettes des dissipateurs thermiques par le tapis du plancher, etc...
- Des interférences risquent de se produire si l'appareil est installé trop près de l'autoradio. Séparer autant que possible l'amplificateur de l'autoradio.
- Si le lecteur de cassette ou le tuner ne sont pas alimentés, vérifier tout d'abord les connexions.
- Cet amplificateur de puissance est doté d'un circuit* destiné à protéger les transistors et les haut-parleurs en cas de défaillance. Ne pas essayer de tester l'efficacité de ce circuit de protection en recouvrant les dissipateurs thermiques ou en effectuant des connexions inadéquates.
- N'utiliser pas l'appareil sur une batterie faible, car sa performance maximale dépend d'une bonne alimentation en électricité.
- Pour des raisons de sécurité, le volume d'écoute de la l'autoradio doit resté modéré afin d'entendre les bruits extérieurs.

Pour toute question ou problème qui ne serait pas traité dans ce manuel, consulter le concessionnaire Sony le plus proche.

Remplacement du fusible

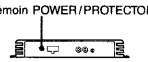
Si le fusible saute, vérifier les connexions d'alimentation et remplacer le fusible. S'il saute de nouveau après son remplacement, un mauvais fonctionnement interne peut être mis en cause. Dans ce cas, consulter le concessionnaire Sony le plus proche.

Avertissement
Utiliser un fusible de l'ampérage spécifié.
L'utilisation d'un fusible d'ampérage supérieur peut causer un endommagement sérieux.



Enlever la protection de plastique et retirer le fusible.

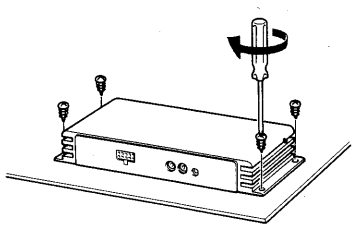
* **Circuit de protection**
Cet amplificateur est équipé d'un circuit de protection qui entre en service dans les cas suivants:
— Surchauffe de l'appareil
— Production d'un courant continu
— Court-circuit aux bornes des haut-parleurs
La couleur du témoin POWER/PROTECTOR passe du vert au rouge et l'appareil s'arrête. Dans ce cas, couper l'alimentation de l'appareil raccordé et retirer la cassette ou le disque compact avant d'examiner la cause de la défaillance. Si l'amplificateur est surchauffé, attendre que l'appareil refroidisse.



Installation

Before Installation

- Mount the unit either inside the trunk room or under a seat.
- Choose the mounting location carefully so that the unit will not interfere with the normal driving functions of the driver and it will not be exposed to direct sunlight or hot air from the heater.
- Do not install the unit under the floor carpet, where the heat dissipation from the unit will be considerably impaired.



Firstly, mount the unit with the supplied screws to a suitable board whose thickness should be more than the length of a supplied screw.
Then mount it securely to the appropriate location.

Installation

Avant l'installation

- Monter l'appareil soit dans le coffre soit sous un siège.
- Bien choisir l'emplacement pour que l'appareil ne gêne pas les mouvements du conducteur et qu'il ne soit pas exposé au soleil ou à l'air du chauffage.
- Ne pas l'installer sous le tapis du plancher où la dissipation thermique ne pourrait pas se faire correctement.

Monter tout d'abord l'appareil sur une planche dout l'épaisseur est supérieure à la longueur des vis.
Fixer ensuite le tout à l'endroit approprié.

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Connections

Caution

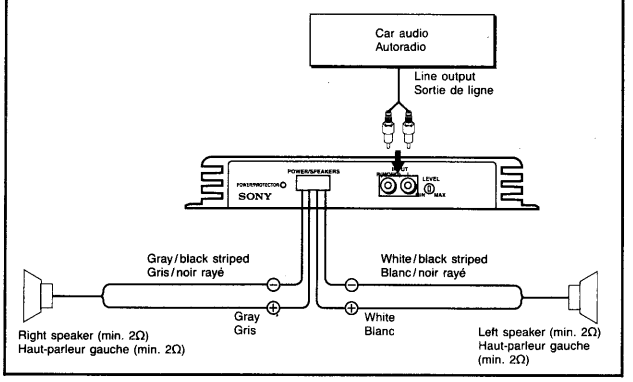
- Before making any connections, disconnect the ground terminal of the car battery to avoid short circuits.
- Be sure to use speakers with adequate power handling capacities. If you use speakers with small capacity, they will be damaged.
- Do not connect the ⊖ terminal of the speaker system with the car chasis, and do not connect the ⊖ terminal of the right speaker with that of the left speaker.
- Run the input and output cords away from the power input lead as running them closely can generate some interference noise.
- This unit is a high powered amplifier therefore it may not perform its full potential if used with the existing speaker cords supplied to the car.
- If your car is equipped with a computer system for navigation or some other purposes, be sure not to remove the ground wire from the car battery. If you disconnect the wire, the memory of the computer may be erased. To avoid short circuits when making connections, connect the +12 V power input lead only after all other leads have been connected.

Branchements

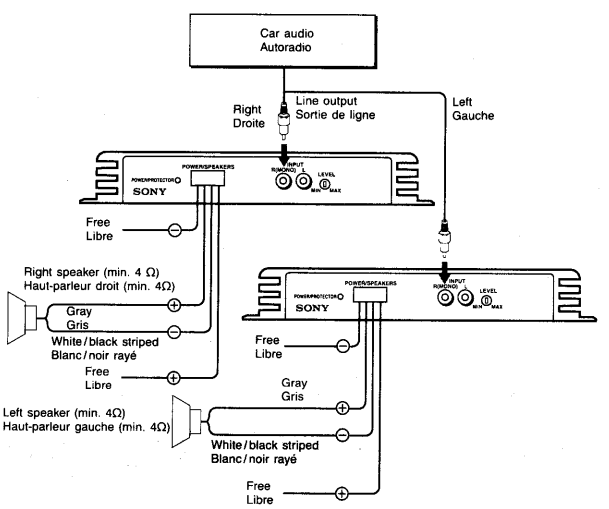
Attention

- Avant d'effectuer les connexions, débrancher la borne de masse de la batterie pour éviter les courts-circuits.
- Utiliser des haut-parleurs d'une puissance adéquate sinon ils risquent d'être endommagès.
- Ne pas raccorder la borne ⊖ d'un haut-parleur sur la carrosserie de la voiture; de même, ne pas établir un contact entre la borne ⊖ du haut-parleur droit et celle du haut-parleur gauche.
- Tenir les cordons d'entrée et de sortie à distance du fil de l'alimentation électrique, pour éviter que des interférences se produisent.
- Cet appareil est un amplificateur de haute puissance et il peut ne pas atteindre sa puissance maximale si les cordons de haut-parleurs fournis avec la voiture lui sont raccordés.
- Si la voiture est équipée d'un ordinateur de navigation ou autres fonctions, s'assurer de ne pas débrancher le fil de mise à la masse de la batterie de la voiture. Si ce fil était débranché, la mémoire de l'ordinateur serait effacée. Pour éviter les courts-circuits lors des branchements, brancher le fil d'entrée d'alimentation +12 volts uniquement après avoir branché tous les autres fils.

2-Speaker system
Système à deux haut-parleurs



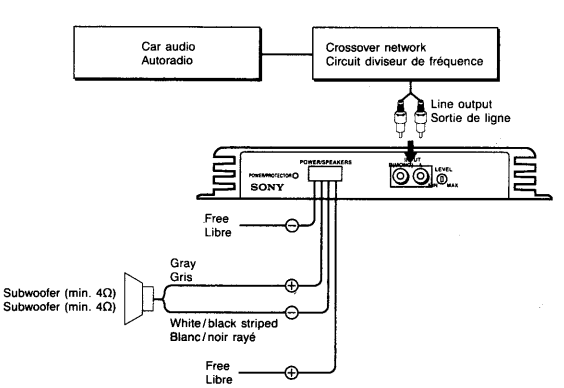
AS a Monaural Amplifier
Utilisation comme amplificateur monophonique



Note
Make sure that the Line output from the car audio is connected to the jack marked "R (MONO)" on the back of the unit.

Remarque
Veiller à ce que la sortie de ligne de la chaîne stéréo auto soit raccordée à la prise portant l'indication "R (MONO)" à l'arrière de l'appareil.

As the Monaural Amplifier for a Subwoofer
Utilisation comme amplificateur monophonique pour subwoofer



Note
The output from this unit will be L (left) + R (right).

Remarque
La sortie de cet appareil sera L (gauche) + R (droite).

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Features

- Maximum power output of 60 watts per channel
- Wide dynamic range and low distortion (less than 0.005 %)
- The XM-3020 can be used as bridging amplifier (max. output of 160 W).
- A protection circuit is provided.
- Pulse power supply* for stable, regulated output power
- Dual mode connection can be made for multi-speaker system.

* **Pulse power supply**
This unit has a built-in convertor which converts the power supply from the DC 12 V car battery into high speed signals by the use of the semiconductor switch. These signals will be stepped up by the built-in pulse transformer and separated into both positive and negative power supplies before converted to the direct current again. This is to regulate the otherwise variable voltage of the car battery.
The light weight power supply system provides the highly efficient power supply with low impedance output.

Caractéristiques

- Puissance de sortie maximum de 60 watts par canal.
- Large plage dynamique et faible distorsion (moins que 0,005 %)
- Le XM-3020 peut être utilisé comme amplificateur de contrôle (sortie maximale 160 W).
- Muni d'un circuit de protection.
- Alimentation par impulsions* pour une puissance de sortie stable et régulière.
- Double connexion pour système multi-enceintes

* **Alimentation par impulsions**
Le convertisseur intégré de cet appareil permet de transformer l'alimentation en courant continu de 12 V en provenance de la batterie en signaux ultra-rapides grâce à l'interrupteur à semiconducteur. Ces signaux peuvent être démultipliés par le transformateur à impulsions intégré afin de régler la tension variable de la batterie de la voiture.
Le système d'alimentation de faible poids fournit un alimentation très efficace avec une sortie de basse impédance.

Dual Mode System (With a Bridged Subwoofer)
Système double mode (avec subwoofer en pont)

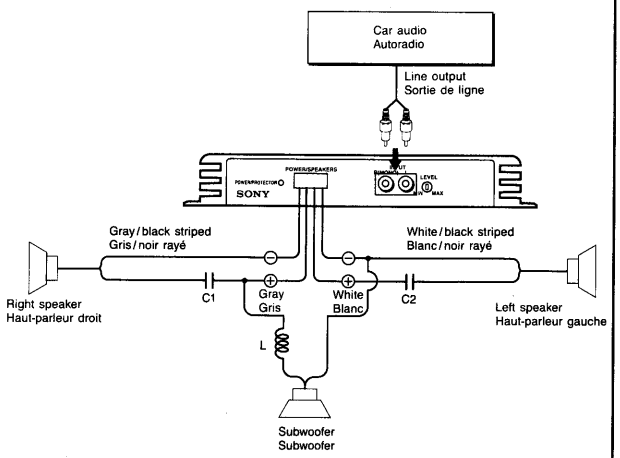


Table of crossover values for 6dB/octave (4 ohms) (not supplied)

Crossover Frequency unit: Hz	L (coil) unit: mH	C1/C2 (capacitor) unit: μF
50	12.7	800
80	8.2	500
100	6.2	400
130	4.7	300
150	4.2	270
200	3.3	200
260	2.4	150
400	1.6	100
600	1.0	68
800	0.8	50
1000	0.6	39

Tableau des valeurs de division pour 6dB/octave (4 ohms) (non fourni)

Fréquence de division unité: Hz	L (bobine) unité: mH	C1/C2 (condensateur) unité: μF
50	12,7	800
80	8,2	500
100	6,2	400
130	4,7	300
150	4,2	270
200	3,3	200
260	2,4	150
400	1,6	100
600	1,0	68
800	0,8	50
1000	0,6	39

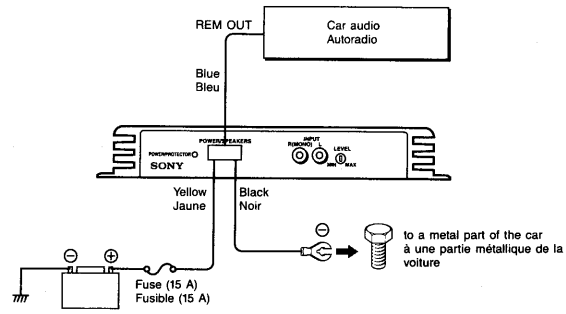
Notes

- When using passive crossover networks in a multi-speaker system, care must be taken as the speaker system's impedance should not be lower than that of the suitable impedance for this unit.
- When you are installing twelve dB/octave systems in your car, the following points must be considered. In a twelve dB/octave system where both a choke and a capacitor are used in series to form a circuit, a great care must be taken when they are connected. In such a circuit, there is going to be an increase in the current which by-passes the speaker with frequencies at around the crossover frequency. If audio signals are continued to be fed in the crossover frequency area, it may cause the amplifier to become abnormally hot or the fuse will be blown. Also if the speaker is disconnected, a series-resonant circuit will be formed by the choke and the capacitor. In this case, the impedance in the resonance area will decrease dramatically resulting in a short circuit like situation causing a damage to the amplifier. Therefore, make sure that a speaker is connected to such a circuit at all times.

Remarque

- Lors de l'utilisation de circuits diviseurs de fréquence passifs dans un système à plusieurs haut-parleurs, veiller à ce que l'impédance du système ne soit pas inférieure à celle convenant à cet appareil.
- Lors de l'installation d'un système douze dB/octave dans votre voiture, les points suivants doivent être pris en considération: Dans un système à douze dB/octave où la bobine d'arrêt et le condensateur sont utilisés en séries pour former un circuit, les connexions doivent être exécutées avec extrêmement de précaution. Dans ce genre de circuit, une augmentation de courant contournant le haut-parleur se produit avec des fréquences se situant autour de la fréquence de division. Si des signaux audio continuent d'être fournis dans la zone de fréquence de division, une surchauffe risque de se produire dans l'amplificateur et le fusible peut sauter. Si le haut-parleur est déconnecté, un circuit de résonance série sera créé par la bobine et le condensateur. Dans ce cas, l'impédance dans la zone de résonance diminuera considérablement et comme dans le cas d'un court-circuit l'amplificateur peut être endommagé. Par conséquent, veiller à ce que le haut-parleur soit toujours raccordé au circuit.

Power Connection Leads
Branchement des fils d'alimentation électrique



Notes on the power supply

- Connect the +12 V power input lead only after all other leads have been connected.
- **Be sure to connect the ground wire of the unit securely to a metal point of the car. A loose connection may cause a malfunction of the amplifier.**
- Make sure to connect the remote control lead of the car audio to the REMOTE lead.
- Use the power supply lead with the fuse attached (at least 15 A).
- Place the fuse in the power supply lead as close as possible to the car battery.
- During a full-power operation, the current of more than 12 ampere will run through the system. Therefore, make sure that the leads to be connected to the **+12 V** and **GND** terminals of this unit respectively must be larger than 14-Gauge (A.W.G.-14) or with the sectional area of more than 2 mm².

Remarques sur l'alimentation électrique

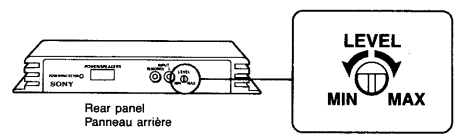
- Ne raccorder le fil d'entrée +12 volts d'alimentation qu'après avoir connecté tous les autres fils.
- **Raccorder solidement le fil de masse de l'appareil à une partie métallique de la voiture, car une connexion relâchée peut entraîner des défaillances de l'amplificateur.**
- Ne pas oublier de raccorder le fil de télécommande de la chaîne stéréo au fil REMOTE.
- Veiller à utiliser un fil d'alimentation électrique muni d'un fusible de 15 ampères au minimum.
- Placer le fusible du fil d'alimentation électrique le plus près possible de la batterie de la voiture.
- Lors de l'utilisation de la puissance maximale, un courant de plus de 12 ampères passe dans le système. Par conséquent, les fils à raccorder sur les bornes **+12 V** et **GND** (masse) de cet appareil doivent être de calibre supérieur à 14 (A.W.G.-14) ou d'un section supérieure à 2 mm².

Level Adjustment Control

The input level can be varied with this control. Turn it towards MAX when the input level of the car audio or CD player seems low or turn it towards MIN to decrease the input level.

Commande de réglage de niveau

Le niveau d'entrée peut être modifié par cette commande. La tourner vers MAX lorsque le niveau d'entrée de l'autoradio ou le lecteur de CD est trop bas ou tourner vers MIN pour le diminuer.



(XM-3020S)

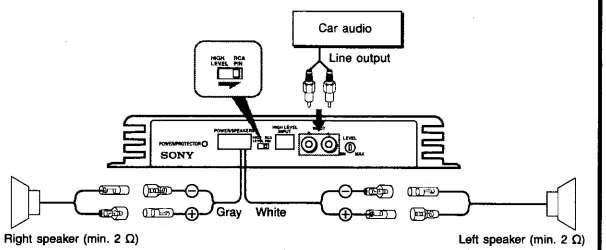
Connections

Cautions

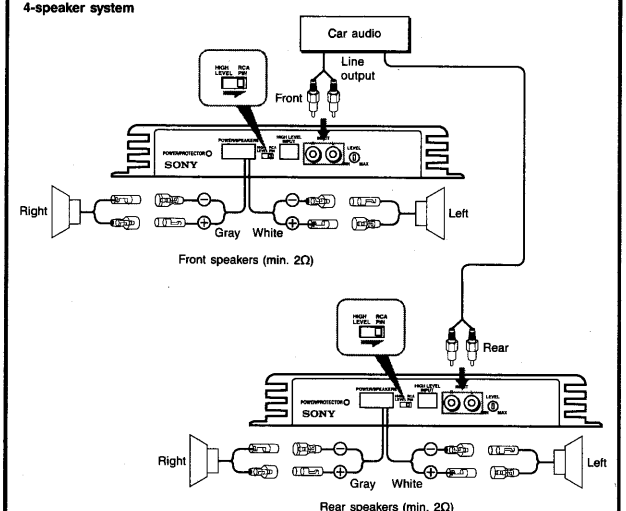
- Before making any connections, disconnect the ground terminal of the car battery to avoid short circuits.
- Be sure to use speakers with adequate power handling capacities. If you use speakers with small capacity, they will be damaged.
- Do not connect the ⊖ terminal of the speaker system with the car chassis, and do not connect the ⊖ terminal of the right speaker with that of the left speaker.
- Run the input and output cords away from the power input lead as running them closely can generate some interference noise.
- This unit is a high powered amplifier. Therefore, it may not perform its full potential if used with the existing speaker cords supplied to the car.
- If your car is equipped with a computer system for nagivation or some other purposes, be sure not to remove the ground wire from the car battery. If you disconnect the wire, the memory of the computer may be erased. To avoid short circuits when making connections, connect the +12 V power input lead only after off other leads have been connected.

Line Output Connection

2-speaker system



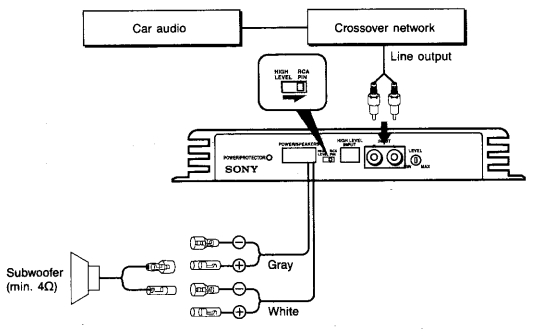
4-speaker system



Connections

Line Output Connection

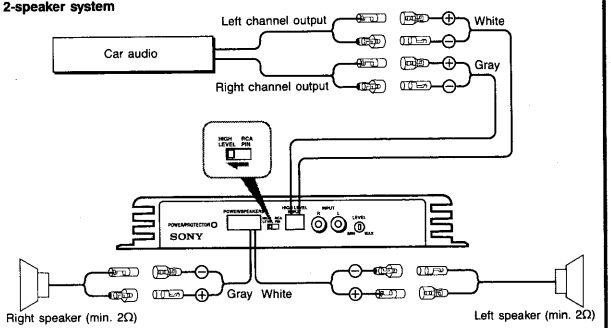
As a monaural amplifier for a subwoofer



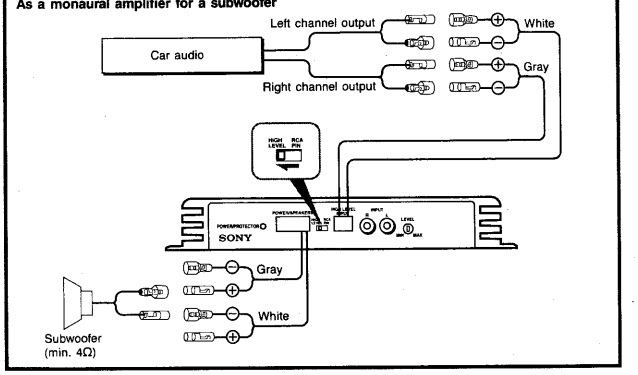
Note
If you wish to use a subwoofer as a monaural speaker, connect the speaker as illustrated above. The output signals of the subwoofer will be the combination of both right and left output signals.

Speaker Output Connection

2-speaker system



As a monaural amplifier for a subwoofer



Note
If you wish to use a subwoofer as a monaural speaker, connect the speaker as illustrated above. The output signals of the subwoofer will be the combination of both right and left output signals.

Connections

Speaker Output Connection

Dual mode system (with a bridged subwoofer)

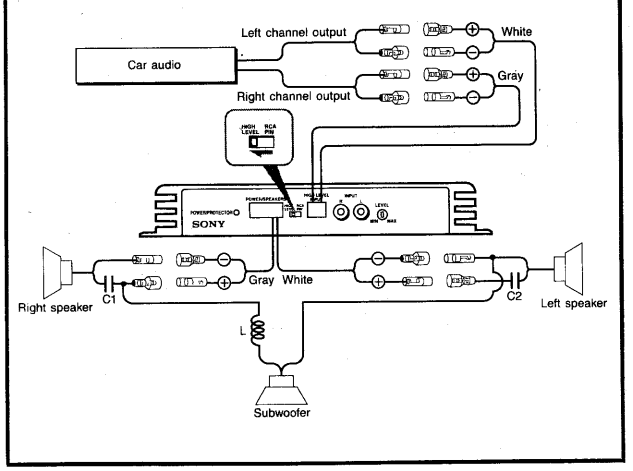


Table of crossover values for 6 dB/octave (4 ohms) (not supplied)

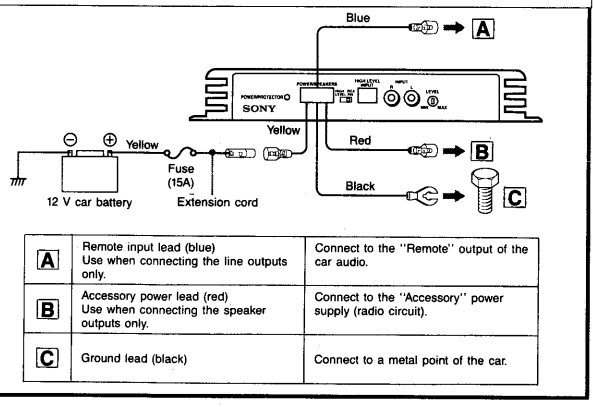
Crossover Frequency unit: Hz	L (coil) unit: mH	C1/C2 (capacitor) unit: μF
50	12.7	800
80	8.2	500
100	6.2	400
130	4.7	300
150	4.2	270
200	3.3	200
260	2.4	150
400	1.6	100
600	1.0	68
800	0.8	50
1000	0.6	39

Notes

- When using passive crossover networks in a multi-speaker system, care must be taken as the speaker system's impedance should not be lower than that of the suitable impedance for this unit.
- When you are installing 12 dB/octave systems in your car, the following points must be considered. In a 12 dB/octave system where both a choke and a capacitor are used in series to form a circuit, a great care must be taken when they are connected. In such a circuit, there is going to be an increase in the current which by-passes the speaker with frequencies at around the crossover frequency. If audio signals are continued to be fed in the crossover frequency area, it may cause the amplifier to become abnormally hot or the fuse will be blown. Also if the speaker is disconnected, a series-resonant circuit will be formed by the choke and the capacitor. In this case, the impedance in the resonance area will decrease dramatically resulting in a short circuit like situation causing a damage to the amplifier. Therefore, make sure that a speaker is connected to such a circuit at all times.

Connections

Power Connection Leads



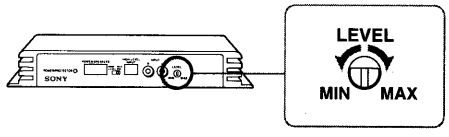
A	Remote input lead (blue) Use when connecting the line outputs only.	Connect to the "Remote" output of the car audio.
B	Accessory power lead (red) Use when connecting the speaker outputs only.	Connect to the "Accessory" power supply (radio circuit).
C	Ground lead (black)	Connect to a metal point of the car.

Notes on the power supply

- Connect the +12 V power input lead (yellow) only after all other leads have been connected.
- **Be sure to connect the ground wire (black) of the unit securely to a metal point of the car. A loose connection may cause a malfunction of the amplifier.**
- When connecting +12 V lead of the unit to the + side of the car battery, be sure to use a 15 A fuse near the battery to avoid short circuit.

Level Adjustment Control

The input level can be varied with this control. Turn it towards MAX when the output level of the car audio or CD player seems low or turn it towards MIN to decrease the input level.



(XM-3020S)

Features

- Built-in Level detector "power on" circuit detects the audio level of the high level input (speaker output level) and automatically turns on the amplifier.
- Maximum power output of 60 watts per channel (at 4 ohms)
- Wide dynamic range and low distortion (less than 0.005%)
- The XM-3020S can be used as a bridging amplifier (max. output of 160W).
- A protection circuit is provided.
- Pulse power supply* for stable, regulated output power
- Dual mode connection can be made for a multi-speaker system.

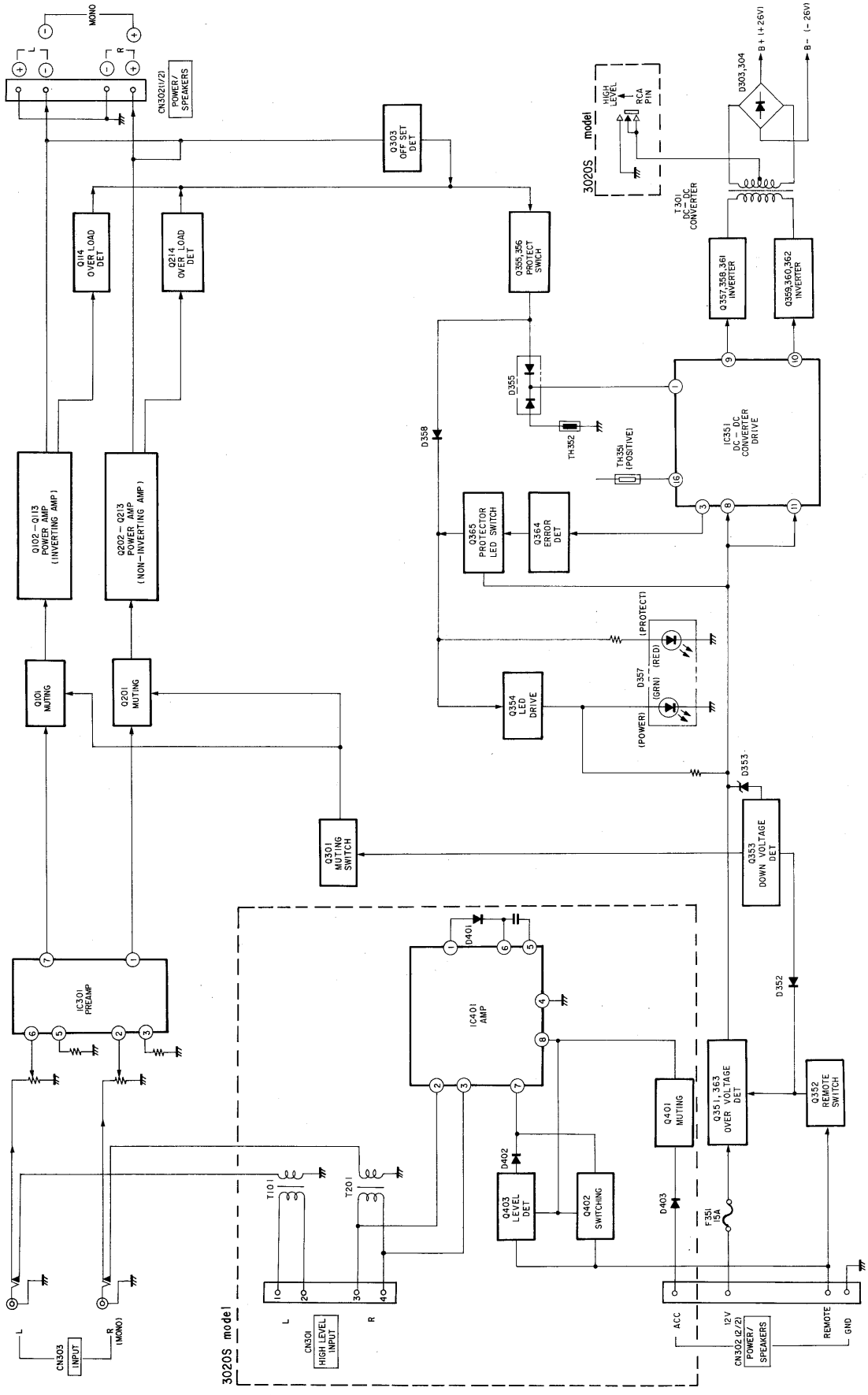
***Pulse power supply**

This unit has a built-in convertor which converts the power supply from the DC 12 V car battery into high speed signals by the use of the semiconductor switch. These signals will be stepped up by the built-in pulse transformer and separated into both positive and negative power supplies before converted to the direct current again. This is to regulate the otherwise variable voltage of the car battery.

The light weight power supply system provides the highly efficient power supply with low impedance output.

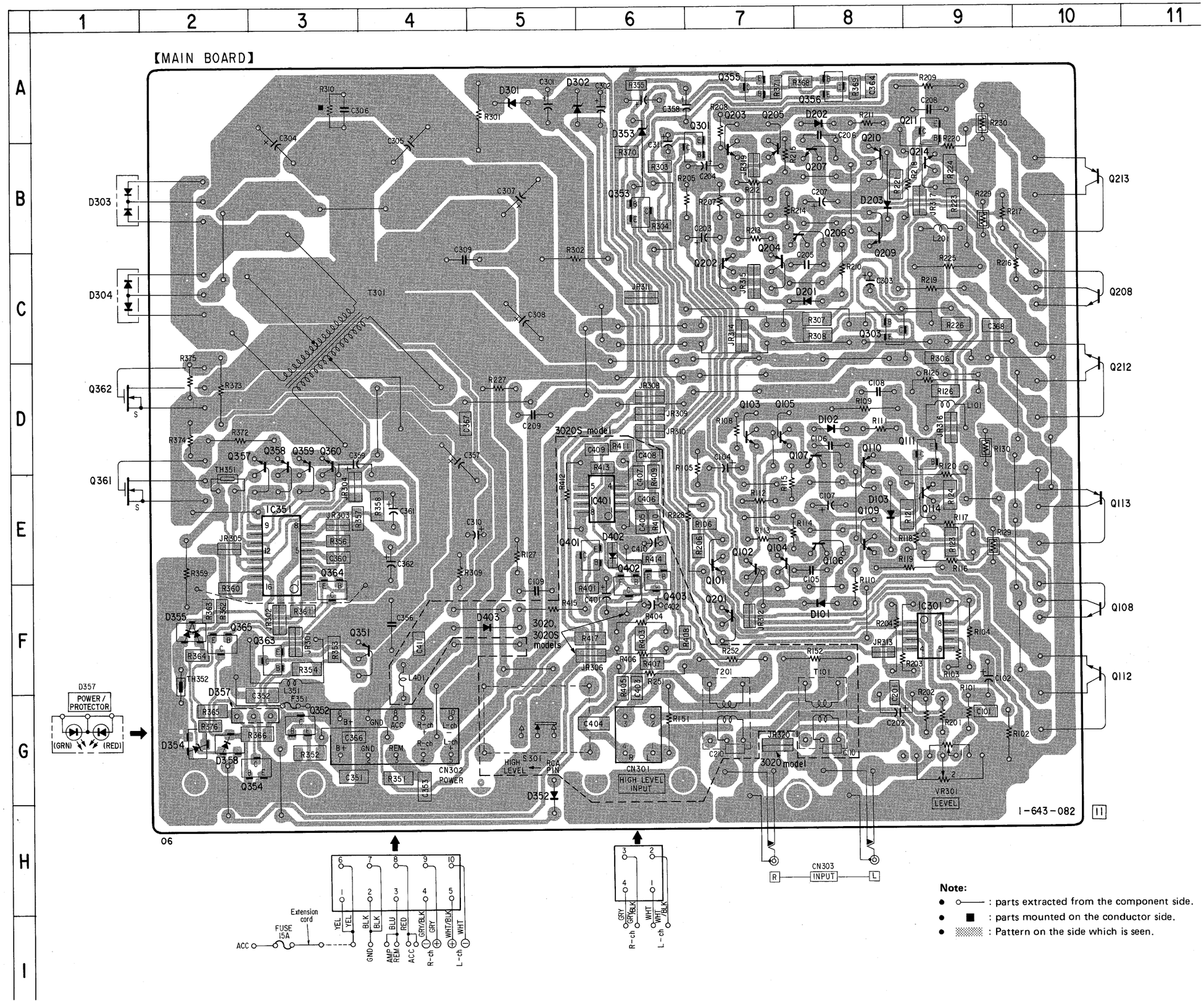
SECTION 1
DIAGRAMS

1-1. BLOCK DIAGRAM



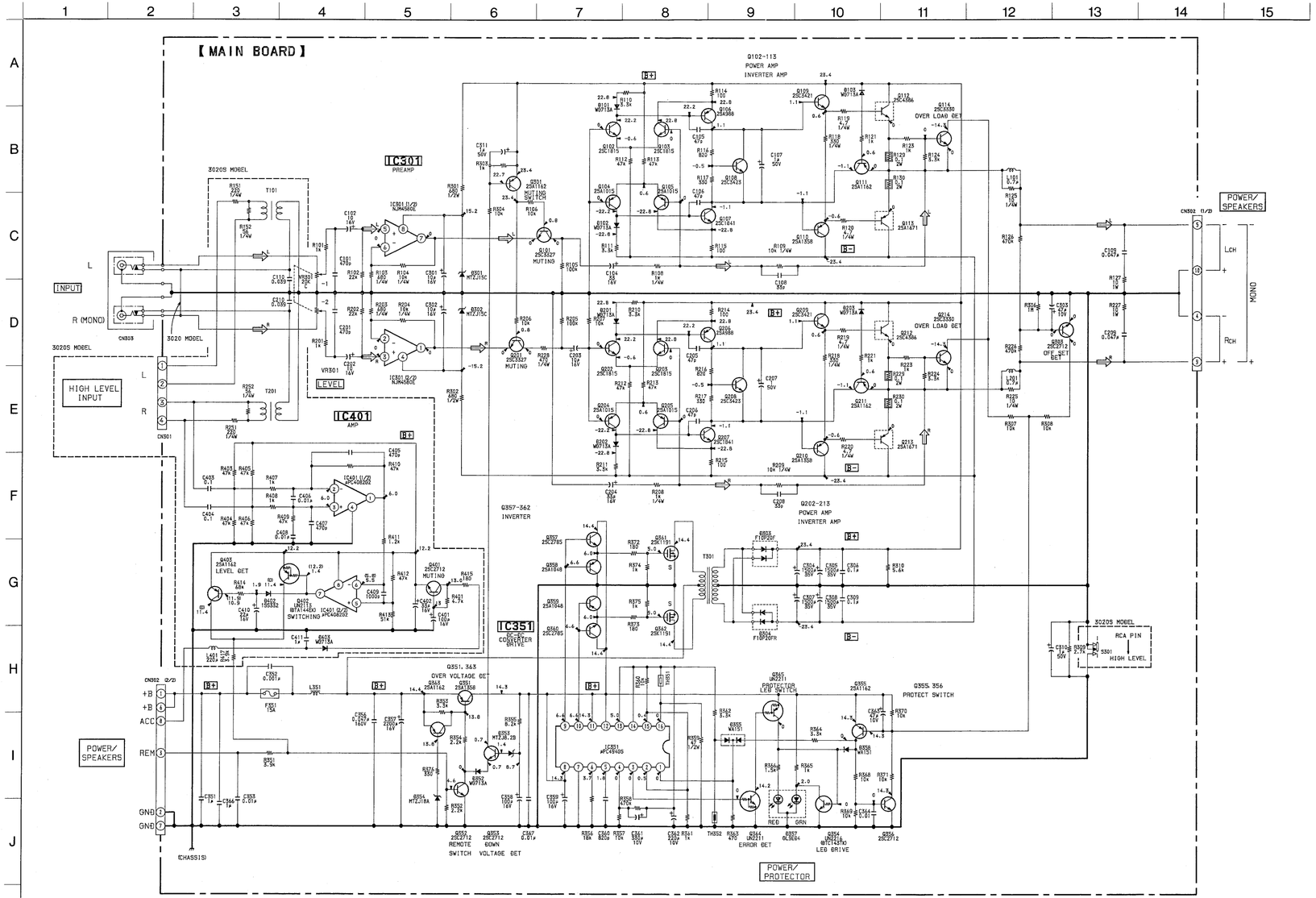
● **Semiconductor Location**

Ref. No.	Location	Ref. No.	Location
D101	F-8	Q113	E-10
D102	D-8	Q114	E-9
D103	E-8	Q201	F-7
D201	C-8	Q202	C-7
D202	A-8	Q203	A-7
D203	B-8	Q204	C-7
D301	A-5	Q205	A-7
D302	A-6	Q206	B-8
D303	B-1	Q207	B-8
D304	C-1	Q208	C-10
D352	G-5	Q209	C-8
D353	A-6	Q210	A-8
D354	G-2	Q211	A-9
D355	F-2	Q212	D-10
D357	F-2	Q213	B-10
D358	G-2	Q214	B-9
D401	E-6	Q301	A-7
D402	E-6	Q303	C-8
D403	F-5	Q351	F-4
		Q352	G-3
IC301	F-9	Q353	B-6
IC351	E-3	Q354	G-3
IC401	E-6	Q355	A-7
		Q356	A-8
Q101	E-7	Q357	D-2
Q102	E-7	Q358	D-3
Q103	D-7	Q359	D-3
Q104	E-7	Q360	D-3
Q105	D-7	Q361	E-1
Q106	E-8	Q362	D-1
Q107	D-8	Q363	F-3
Q108	F-10	Q364	E-3
Q109	E-8	Q365	F-2
Q110	D-8	Q401	E-5
Q111	D-9	Q402	E-6
Q112	F-10	Q403	F-6



Note:

- ○—— : parts extracted from the component side.
- ■ : parts mounted on the conductor side.
- ▨ : Pattern on the side which is seen.



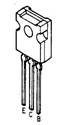
06

1-4. SEMICONDUCTOR LEAD LAYOUTS

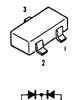
DTC143TK
2SA1162
2SC2712-G

2SA1358-Y

2SC3421-Y
2SC3423

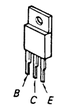


MA152WK



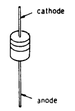
2SA988-PAFAEA
2SC1841-PAFAEA

2SA1671-Y
2SC4386-Y



F10P20FR

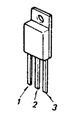
RD7.5ES-B2
RD15ES-B3
WG713A



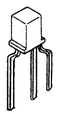
2SA1015-GR
2SC1815-GR

2SC1815-Y
2SC3327-A
2SC3330-S

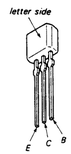
F10P20F (R)



GL9ED4



2SA1175-HFE

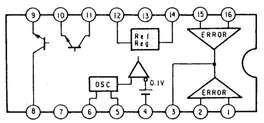


Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/6W or less unless otherwise specified.
- : nonflammable resistor.
- B+ : B+ line.
- Power voltage is dc 14.4V and fed with regulated dc power supply from external power voltage terminal (CN302).
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark: REMOTE ON
  ( ): REMOTE OFF.
- Voltages are taken with a VOM. (Input impedance 10MΩ) Voltage variations may be noted due to normal production tolerances.
- Signal path.
  : L-ch
  : R-ch

1-5. IC BLOCK DIAGRAM

IC351 μPC494GS

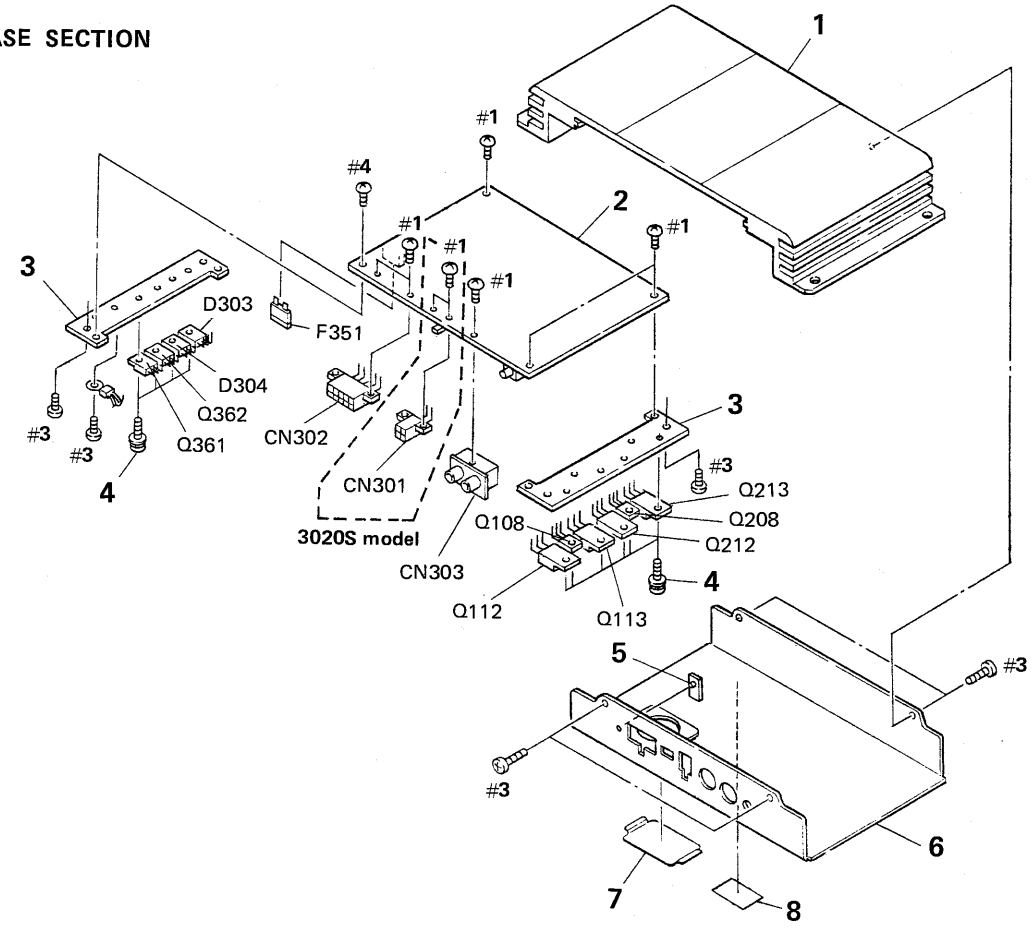


SECTION 2 EXPLODED VIEW

NOTE:

- –XX, –X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts color / Cabinet's color
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

2-1. CASE SECTION



Ref. No.	Part No.	Description	Remark
* 1	3-375-656-01	HEAT SINK (3020S)	
* 1	3-375-656-11	HEAT SINK (3020)	
* 2	A-3273-873-A	MAIN BOARD, COMPLETE (3020S)	
* 2	A-3273-875-A	MAIN BOARD, COMPLETE (3020)	
* 3	3-375-657-01	HEAT SINK, SUB	
4	3-376-812-01	SCREW (DIA. 3X10 WASHER)	
* 5	2-116-809-01	INDICATOR	
* 6	3-375-658-01	PANEL (A) (3020S)	
* 6	3-375-658-11	PANEL (A) (3020)	
7	3-375-659-01	COVER	
* 8	3-376-833-01	LABEL, MODEL NUMBER (3020:US)	
* 8	3-376-827-01	LABEL, MODEL NUMBER (3020S:AEP, UK, E)	
* 8	3-376-830-01	LABEL, MODEL NUMBER (3020S:Germany)	
* 8	3-376-834-01	LABEL, MODEL NUMBER (3020:Canadian)	

Ref. No.	Part No.	Description	Remark
* CN301	1-691-785-11	PIN, CONNECTOR (PC BOARD) 4P (HIGH LEVEL INPUT) (3020S)	
* CN302	1-691-786-11	PIN, CONNECTOR (PC BOARD) 10P (POWER/SPEAKERS)	
CN303	1-580-281-11	JACK, PIN 2P (INPUT)	
D303	8-719-210-30	DIODE F10P20F(R)	
D304	8-719-210-38	DIODE F10P20FR	
F351	1-532-982-11	FUSE (BRADE TYPE) (AUTO FUSE) (15A)	
Q108	8-729-203-45	TRANSISTOR 2SC3423	
Q112	8-729-321-40	TRANSISTOR 2SC4386-Y	
Q113	8-729-321-37	TRANSISTOR 2SA1671-Y	
Q208	8-729-203-45	TRANSISTOR 2SC3423	
Q212	8-729-321-40	TRANSISTOR 2SC4386-Y	
Q213	8-729-321-37	TRANSISTOR 2SA1671-Y	
Q361	8-729-322-52	TRANSISTOR 2SK1191	
Q362	8-729-322-52	TRANSISTOR 2SK1191	

SECTION 3
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- –XX, –X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA...: μA..., uPA...: μPA...,
  uPB...: μPB..., uPC...: μPC...,
  uPD...: μPD...
- CAPACITORS
  uF: μF
- COILS
  uH: μH

When indicating parts by reference number, please include the board name.

Ref.No.	Part No.	Description				Remark
*	A-3273-875-A	MAIN BOARD, COMPLETE (3020)				
		**********				
*	A-3273-873-A	MAIN BOARD, COMPLETE (3020S)				
		**********				
	1-533-179-21	HOLDER, FUSE				
*	3-375-657-01	HEAT SINK, SUB				
	3-376-812-01	SCREW (DIA. 3X10 WASHER)				
	7-682-648-09	SCREW (+BVW) (3X8) (SN), TAPPING				
	7-685-646-79	SCREW +P 3X8 TYPE2 NON-SLIT				
		< CAPACITOR >				
C101	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	
C102	1-126-059-11	ELECT	10uF	20%	50V	
C104	1-124-034-51	ELECT	33uF	20%	16V	
C105	1-162-215-31	CERAMIC	47PF	5%	50V	
C106	1-162-215-31	CERAMIC	47PF	5%	50V	
C107	1-123-380-00	ELECT	1uF	20%	50V	
C108	1-107-159-00	MICA	33PF	5%	500V	
C109	1-136-161-00	FILM	0.047uF	5%	50V	
C110	1-162-587-11	CERAMIC CHIP	0.039uF	10%	25V	(3020S)
C201	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	
C202	1-126-059-11	ELECT	10uF	20%	50V	
C203	1-126-059-11	ELECT	10uF	20%	50V	
C204	1-124-034-51	ELECT	33uF	20%	16V	
C205	1-162-215-31	CERAMIC	47PF	5%	50V	
C206	1-162-215-31	CERAMIC	47PF	5%	50V	
C207	1-123-380-00	ELECT	1uF	20%	50V	
C208	1-107-159-00	MICA	33PF	5%	500V	
C209	1-136-161-00	FILM	0.047uF	5%	50V	
C210	1-162-587-11	CERAMIC CHIP	0.039uF	10%	25V	(3020S)
C301	1-126-059-11	ELECT	10uF	20%	50V	
C302	1-126-059-11	ELECT	10uF	20%	50V	

Ref.No.	Part No.	Description				Remark
C303	1-124-126-00	ELECT	47uF	20%	10V	
C304	1-126-306-51	ELECT	1500uF	20%	35V	
C305	1-126-306-51	ELECT	1500uF	20%	35V	
C306	1-136-165-00	FILM	0.1uF	5%	50V	
C307	1-126-306-51	ELECT	1500uF	20%	35V	
C308	1-126-306-51	ELECT	1500uF	20%	35V	
C309	1-136-165-00	FILM	0.1uF	5%	50V	
C310	1-124-903-11	ELECT	1uF	20%	50V	
C311	1-124-903-11	ELECT	1uF	20%	50V	
C351	1-162-638-11	CERAMIC CHIP	1uF		16V	
C352	1-163-205-00	CERAMIC CHIP	0.001uF	5%	50V	
C353	1-163-059-00	CERAMIC CHIP	0.01uF	10%	50V	
C356	1-136-961-11	FILM	0.047uF	10%	160V	
C357	1-128-531-51	ELECT	2200uF	20%	16V	
C358	1-126-101-11	ELECT	100uF	20%	16V	
C359	1-126-101-11	ELECT	100uF	20%	16V	
C360	1-163-139-00	CERAMIC CHIP	820PF	5%	50V	
C361	1-124-604-00	ELECT	330uF	20%	10V	
C362	1-126-176-11	ELECT	220uF	20%	10V	
C363	1-124-126-00	ELECT	47uF	20%	10V	
C364	1-164-232-11	CERAMIC CHIP	0.01uF		50V	
C366	1-162-638-11	CERAMIC CHIP	1uF		16V	
C367	1-163-059-00	CERAMIC CHIP	0.01uF	10%	50V	
C401	1-126-101-11	ELECT	100uF	20%	16V	(3020S)
C402	1-124-034-51	ELECT	33uF	20%	16V	(3020S)
C403	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V	(3020S)
C404	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V	(3020S)
C405	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	(3020S)
C406	1-164-232-11	CERAMIC CHIP	0.01uF		50V	(3020S)
C407	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	(3020S)
C408	1-164-232-11	CERAMIC CHIP	0.01uF		50V	(3020S)
C409	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V	(3020S)
C410	1-126-233-11	ELECT	22uF	20%	50V	(3020S)

MAIN

Ref.No.	Part No.	Description	Remark
C411	1-162-638-11	CERAMIC CHIP 1uF	16V (3020S)
		< CONNECTOR >	
* CN301	1-691-785-11	PIN, CONNECTOR (PC BOARD) 4P (HIGH LEVEL INPUT) (3020S)	
* CN302	1-691-786-11	PIN, CONNECTOR (PC BOARD) 10P (POWER/SPEAKERS)	
CN303	1-580-281-11	JACK, PIN 2P (INPUT)	
		< DIODE >	
D101	8-719-987-06	DIODE WG713A	
D102	8-719-987-06	DIODE WG713A	
D103	8-719-987-06	DIODE WG713A	
D201	8-719-987-06	DIODE WG713A	
D202	8-719-987-06	DIODE WG713A	
D203	8-719-987-06	DIODE WG713A	
D301	8-719-110-42	DIODE RD15ES-B3	
D302	8-719-110-42	DIODE RD15ES-B3	
D303	8-719-210-30	DIODE F10P20F(R)	
D304	8-719-210-38	DIODE F10P20FR	
D352	8-719-987-06	DIODE WG713A	
D353	8-719-110-03	DIODE RD7.5ES-B2	
D354	8-719-110-49	DIODE RD18ES-B2	
D355	8-719-400-18	DIODE MA152WK	
D357	8-719-989-31	DIODE GL9ED4	
D358	8-719-400-18	DIODE MA152WK	
D402	8-719-976-31	DIODE 1SS332 (3020S)	
D403	8-719-987-06	DIODE WG713A (3020S)	
		< FUSE >	
F351	1-532-982-11	FUSE (BRADE TYPE) (AUTO FUSE) (15A)	
		< IC >	
IC301	8-759-711-85	IC NJM4580E-D	
IC351	8-759-144-88	IC uPC494GS	
IC401	8-759-103-09	IC uPC4082G2 (3020S)	
		< JUMPER >	
JR301	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR302	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR303	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR304	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR305	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR306	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR308	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR309	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR310	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR311	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR312	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR313	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR314	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR315	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR316	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR317	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR319	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR320	1-216-296-00	METAL CHIP 0 5% 1/8W	(3020)
		< COIL >	
L101	1-407-365-00	COIL, CHOKE 0.7uH	
L201	1-407-365-00	COIL, CHOKE 0.7uH	
L351	1-424-638-11	COIL, CHOKE	
L401	1-410-336-11	INDUCTOR 220uH (3020S)	
		< TRANSISTOR >	
Q101	8-729-203-49	TRANSISTOR 2SC3327-B	
Q102	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q103	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q104	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q105	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q106	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q107	8-729-140-84	TRANSISTOR 2SC1841-PAFAEA	
Q108	8-729-203-45	TRANSISTOR 2SC3423	
Q109	8-729-207-82	TRANSISTOR 2SC3421-Y	
Q110	8-729-207-89	TRANSISTOR 2SA1358-Y	
Q111	8-729-216-22	TRANSISTOR 2SA1162	
Q112	8-729-321-40	TRANSISTOR 2SC4386-Y	
Q113	8-729-321-37	TRANSISTOR 2SA1671-Y	
Q114	8-729-820-24	TRANSISTOR 2SC3330-T	
Q201	8-729-203-49	TRANSISTOR 2SC3327-B	
Q202	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q203	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q204	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q205	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q206	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q207	8-729-140-84	TRANSISTOR 2SC1841-PAFAEA	
Q208	8-729-203-45	TRANSISTOR 2SC3423	
Q209	8-729-207-82	TRANSISTOR 2SC3421-Y	
Q210	8-729-207-89	TRANSISTOR 2SA1358-Y	
Q211	8-729-216-22	TRANSISTOR 2SA1162	
Q212	8-729-321-40	TRANSISTOR 2SC4386-Y	
Q213	8-729-321-37	TRANSISTOR 2SA1671-Y	
Q214	8-729-820-24	TRANSISTOR 2SC3330-T	
Q301	8-729-216-22	TRANSISTOR 2SA1162	
Q303	8-729-230-49	TRANSISTOR 2SC2712-G	
Q351	8-729-207-89	TRANSISTOR 2SA1358-Y	
Q352	8-729-230-49	TRANSISTOR 2SC2712-G	

Ref. No.	Part No.	Description				Remark
Q353	8-729-230-49	TRANSISTOR	2SC2712-G			
Q354	8-729-900-98	TRANSISTOR	DTC143TK			
Q355	8-729-216-22	TRANSISTOR	2SA1162			
Q356	8-729-230-49	TRANSISTOR	2SC2712-G			
Q357	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q358	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q359	8-729-119-76	TRANSISTOR	2SA1175-HFE			
Q360	8-729-119-78	TRANSISTOR	2SC2785-HFE			
Q361	8-729-322-52	TRANSISTOR	2SK1191			
Q362	8-729-322-52	TRANSISTOR	2SK1191			
Q363	8-729-216-22	TRANSISTOR	2SA1162			
Q364	8-729-421-22	TRANSISTOR	UN2211			
Q365	8-729-424-18	TRANSISTOR	UN2113			
Q401	8-729-230-49	TRANSISTOR	2SC2712-G			(3020S)
Q402	8-729-424-18	TRANSISTOR	UN2113-TX			(3020S)
Q403	8-729-216-22	TRANSISTOR	2SA1162			(3020S)
		< RESISTOR >				
R101	1-259-428-81	CARBON	1K	5%	1/6W	
R102	1-259-460-81	CARBON	22K	5%	1/6W	
R103	1-249-548-81	CARBON	680	5%	1/4W	
R104	1-249-576-81	CARBON	10K	5%	1/4W	
R105	1-259-476-81	CARBON	100K	5%	1/6W	
R106	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R108	1-259-428-81	CARBON	1K	5%	1/6W	
R109	1-247-725-11	CARBON	10K	5%	1/4W	
R110	1-259-440-81	CARBON	3.3K	5%	1/6W	
R111	1-259-440-81	CARBON	3.3K	5%	1/6W	
R112	1-259-468-81	CARBON	47K	5%	1/6W	
R113	1-259-468-81	CARBON	47K	5%	1/6W	
R114	1-259-404-81	CARBON	100	5%	1/6W	
R115	1-259-404-81	CARBON	100	5%	1/6W	
R116	1-259-426-81	CARBON	820	5%	1/6W	
R117	1-259-416-81	CARBON	330	5%	1/6W	
R118	1-247-706-11	CARBON	330	5%	1/4W	
R119	1-260-263-11	CARBON	4.7	5%	1/4W	
R120	1-260-263-11	CARBON	4.7	5%	1/4W	
R121	1-216-198-00	METAL CHIP	1K	5%	1/8W	
R123	1-216-198-00	METAL CHIP	1K	5%	1/8W	
R124	1-216-210-00	METAL GLAZE	3.3K	5%	1/8W	
R125	1-249-504-11	CARBON	10	5%	1/4W	
R126	1-216-262-00	METAL GLAZE	470K	5%	1/8W	
R127	1-215-857-11	METAL OXIDE	10	5%	1W	F
R129	1-217-611-21	RES, METAL PLATE	0.1		2W	
R130	1-217-611-21	RES, METAL PLATE	0.1		2W	
R151	1-247-704-11	CARBON	220	5%	1/4W	(3020S)
R152	1-249-522-81	CARBON	56	5%	1/4W	(3020S)
R201	1-259-428-81	CARBON	1K	5%	1/6W	
R202	1-259-460-81	CARBON	22K	5%	1/6W	
R203	1-249-548-81	CARBON	680	5%	1/4W	
R204	1-249-576-81	CARBON	10K	5%	1/4W	
R205	1-259-476-81	CARBON	100K	5%	1/6W	
R206	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R207	1-259-452-81	CARBON	10K	5%	1/6W	
R208	1-259-428-81	CARBON	1K	5%	1/6W	
R209	1-247-725-11	CARBON	10K	5%	1/4W	
R210	1-259-440-81	CARBON	3.3K	5%	1/6W	
R211	1-259-440-81	CARBON	3.3K	5%	1/6W	
R212	1-259-468-81	CARBON	47K	5%	1/6W	
R213	1-259-468-81	CARBON	47K	5%	1/6W	
R214	1-259-404-81	CARBON	100	5%	1/6W	
R215	1-259-404-81	CARBON	100	5%	1/6W	
R216	1-259-426-81	CARBON	820	5%	1/6W	
R217	1-259-416-81	CARBON	330	5%	1/6W	
R218	1-247-706-11	CARBON	330	5%	1/4W	
R219	1-260-263-11	CARBON	4.7	5%	1/4W	
R220	1-260-263-11	CARBON	4.7	5%	1/4W	
R221	1-216-198-00	METAL CHIP	1K	5%	1/8W	
R223	1-216-198-00	METAL CHIP	1K	5%	1/8W	
R224	1-216-210-00	METAL GLAZE	3.3K	5%	1/8W	
R225	1-249-504-11	CARBON	10	5%	1/4W	
R226	1-216-262-00	METAL GLAZE	470K	5%	1/8W	
R227	1-215-857-11	METAL OXIDE	10	5%	1W	F
R228	1-247-708-11	CARBON	470	5%	1/4W	
R229	1-217-611-21	RES, METAL PLATE	0.1		2W	
R230	1-217-611-21	RES, METAL PLATE	0.1		2W	
R251	1-247-704-11	CARBON	220	5%	1/4W	(3020S)
R252	1-249-522-81	CARBON	56	5%	1/4W	(3020S)
R301	1-249-548-81	CARBON	680	5%	1/4W	
R302	1-249-548-81	CARBON	680	5%	1/4W	
R303	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R304	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R306	1-216-270-00	METAL GLAZE	1M	5%	1/8W	
R307	1-216-222-00	METAL GLAZE	10K	5%	1/8W	
R308	1-216-222-00	METAL GLAZE	10K	5%	1/8W	
R309	1-249-562-11	CARBON	2.7K	5%	1/4W	
R310	1-249-426-11	CARBON	5.6K	5%	1/4W	
R351	1-216-212-00	METAL GLAZE	3.9K	5%	1/8W	
R352	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W	
R353	1-216-210-00	METAL GLAZE	3.3K	5%	1/8W	
R354	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W	
R355	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R356	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R357	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R358	1-216-262-00	METAL GLAZE	470K	5%	1/8W	
R359	1-260-083-11	CARBON	47	5%	1/2W	
R360	1-216-073-00	METAL CHIP	10K	5%	1/10W	

MAIN

Ref.No.	Part No.	Description				Remark
R361	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R362	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R363	1-216-041-00	METAL CHIP	470	5%	1/10W	
R364	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R365	1-216-198-00	METAL CHIP	1K	5%	1/8W	
R366	1-216-202-00	METAL GLAZE	1.5K	5%	1/8W	
R368	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R369	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R370	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R371	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R372	1-259-410-81	CARBON	180	5%	1/6W	
R373	1-259-410-81	CARBON	180	5%	1/6W	
R374	1-259-428-81	CARBON	1K	5%	1/6W	
R375	1-259-428-81	CARBON	1K	5%	1/6W	
R376	1-216-037-00	METAL CHIP	330	5%	1/10W	
R401	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	(3020S)
R403	1-216-691-11	METAL CHIP	47K	0.5%	1/10W	(3020S)
R404	1-215-461-00	CARBON	47K	1%	1/4W	(3020S)
R405	1-216-691-11	METAL CHIP	47K	0.5%	1/10W	(3020S)
R406	1-215-461-00	CARBON	47K	1%	1/4W	(3020S)
R407	1-216-049-00	METAL CHIP	1K	5%	1/10W	(3020S)
R408	1-216-049-00	METAL CHIP	1K	5%	1/10W	(3020S)
R409	1-216-089-00	METAL CHIP	47K	5%	1/10W	(3020S)
R410	1-216-089-00	METAL CHIP	47K	5%	1/10W	(3020S)
R411	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	(3020S)
R412	1-215-461-00	CARBON	47K	1%	1/4W	(3020S)
R413	1-216-692-11	METAL CHIP	51K	5%	1/10W	(3020S)
R414	1-216-093-00	METAL CHIP	68K	5%	1/10W	(3020S)
R415	1-259-410-81	CARBON	180	5%	1/6W	(3020S)
R417	1-216-212-00	METAL GLAZE	3.9K	5%	1/8W	(3020S)
		< SWITCH >				
S301	1-570-358-11	SWITCH, SLIDE (HIGH LEVEL/RCA PIN) (3020S)				
		< TRANSFORMER >				
T101	1-423-272-11	TRANSFORMER, INPUT (3020S)				
T201	1-423-272-11	TRANSFORMER, INPUT (3020S)				
T301	1-450-843-11	TRANSFORMER, DC-DC CONVERTER				
		< THERMISTOR >				
TH351	1-809-664-31	THERMISTOR, POSITIVE				
TH352	1-808-779-11	THERMISTOR				
		< VARIABLE RESISTOR >				
VR301	1-238-817-21	RES, VAR, CARBON 20K/20K (LEVEL)				

****

Ref.No.	Part No.	Description	Remark
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-690-779-11	CORD (WITH CONNECTOR) (3020S) 4P(HIGH LEVEL INPUT)	
	1-690-780-11	CORD (WITH CONNECTOR) (3020S) 10P(POWER/SPEAKERS)	
	1-690-781-11	CORD (WITH CONNECTOR) (3020) 10P(POWER/SPEAKERS)	
	1-690-862-11	CORD (WITH CONNECTOR) (3020S) (1-532-552-00 FUSE 15A)	
	3-377-789-01	INDIVIDUAL CARTON (3020)	
	3-377-791-01	CUSHION	
	3-378-305-01	INDIVIDUAL CARTON (3020S)	
	3-701-616-00	BAG, POLYETHYLENE	
	3-701-625-00	BAG, POLYETHYLENE	
	3-754-763-11	MANUAL, INSTRUCTION (3020S) (ENGLISH, GERMAN, SPANISH, CHINESE)	
	3-754-763-41	MANUAL, INSTRUCTION (3020S:AEP) (FRENCH, DUTCH, SWEDISH, ITALIAN, PORTUGUESE)	
	3-754-764-21	MANUAL, INSTRUCTION (3020) (ENGLISH, FRENCH)	
	7-685-162-01	SCREW (4X14), (+) (B) TAPPING	

****

HARDWARE LIST

****

#1	7-685-646-79	SCREW +P 3X8 TYPE2 NON-SLIT
#2	7-682-648-09	SCREW (+BVW) (3X8) (SN), TAPPING
#3	7-685-546-14	SCREW +BTP 3X8 TYPE2 N-S
#4	7-685-645-79	SCREW +BTP 3X6 TYPE2 N-S

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XM-3020/3020S

SONY
SERVICE MANUAL

US Model
Canadian Model
AEP Model
XM-3020

AEP Model
UK Model
E Model
XM-3020S

SUPPLEMENT-1

File this supplement with the service manual.

Subject : AEP Model is added in XM-3020.

AEP Model has been added in XM-3020.
As only the difference parts from XM-3020 US model are described in this service manual supplement-1.
Refer to XM-3020/3020S service manual previously issued for the other information.

DIFFERENCE PARTS

Page	Ref. No.	XM-3020 US model	XM-3020 AEP model
14	8	Part No. Description * 3-376-833-01 LABEL, MODEL NUMBER	Part No. Description * 3-376-833-01 LABEL, MODEL NUMBER * 3-376-835-01 LABEL, MODEL NUMBER (Germany)
18	–	3-754-764-21 MANUAL, INSTRUCTION (ENGLISH, FRENCH)	3-754-764-41 MANUAL, INSTRUCTION (FRENCH, DUTCH, SWEDISH ITALIAN, PORTUGUESE)

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

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XM-3020/3020S

SONY®
SERVICE MANUAL

US Model
Canadian Model
AEP Model
XM-3020

AEP Model
UK Model
E Model
XM-3020S

SUPPLEMENT-2

File this supplement with the service manual.

Subject : MAIN BOARD'S MODIFICATION.

1. DIAGRAMS

1-1. PRINTED WIRING BOARD

- **Semiconductor Location**

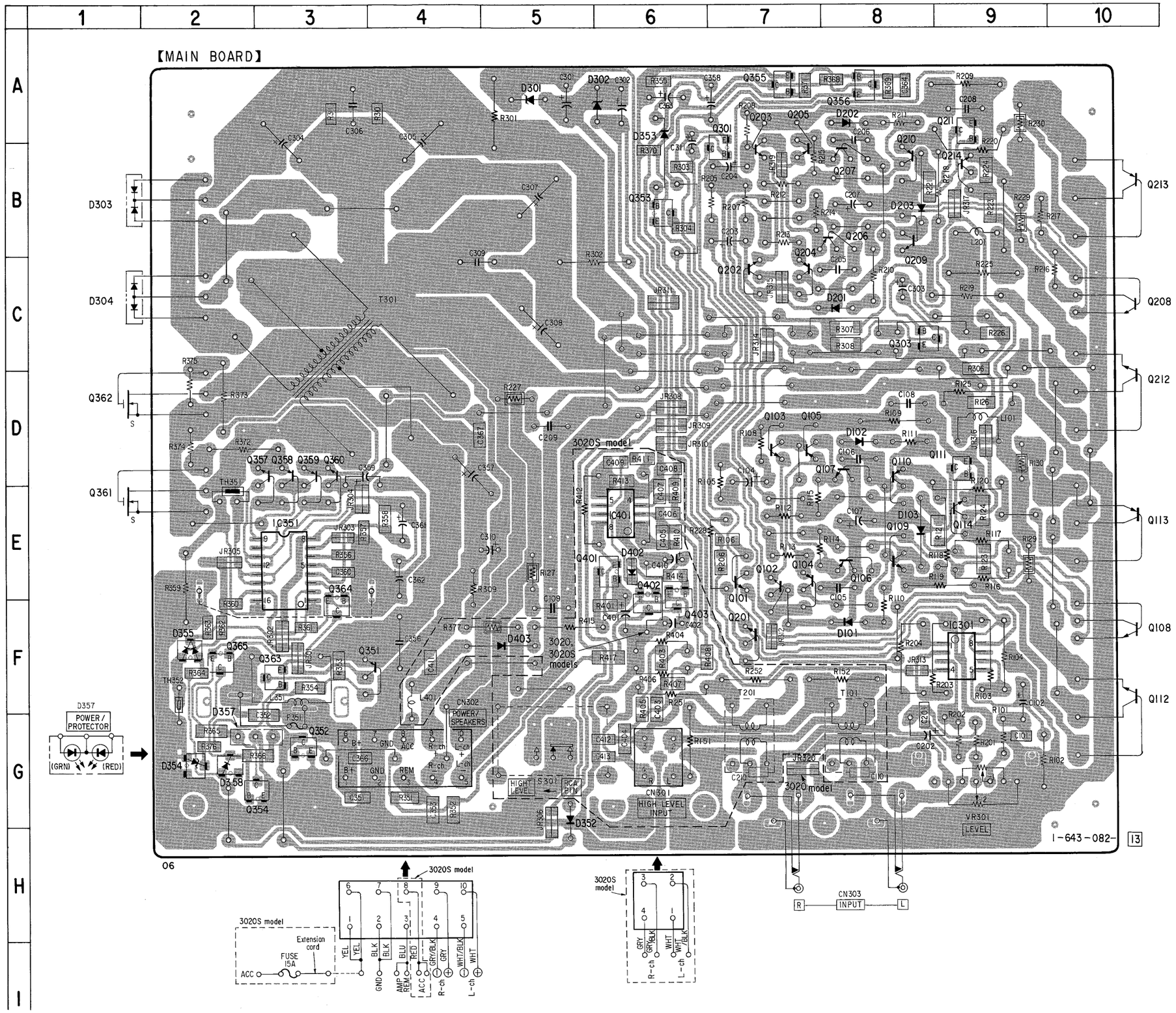
Ref. No.	Location	Ref. No.	Location
D101	F-8	Q114	E-9
D102	D-8	Q201	F-7
D103	E-8	Q202	C-7
D201	C-8	Q203	A-7
D202	A-8	Q204	B-7
D203	B-8	Q205	A-7
D301	A-5	Q206	B-8
D302	A-5	Q207	B-8
D303	B-1	Q208	C-10
D304	C-1	Q209	C-8
D352	G-5	Q210	A-8
D353	A-6	Q211	A-9
D354	G-2	Q212	D-10
D355	F-2	Q213	B-10
D357	F-2	Q214	B-9
D358	G-2	Q301	A-2
D402	E-6	Q303	C-8
D403	F-5	Q351	F-3
		Q352	G-3
IC301	F-9	Q353	B-6
IC351	E-3	Q354	G-2
IC401	E-6	Q355	A-7
		Q356	A-8
Q101	E-7	Q357	D-3
Q102	E-7	Q358	D-3
Q103	D-7	Q359	D-3
Q104	E-7	Q360	D-3
Q105	D-7	Q361	E-1
Q106	E-8	Q362	D-1
Q107	D-8	Q363	F-3
Q108	F-10	Q364	E-3
Q109	E-8	Q365	F-2
Q110	D-8	Q401	E-5
Q111	D-9	Q402	E-6
Q112	F-10	Q403	F-6
Q113	E-10		

Note on Mounting Diagram:

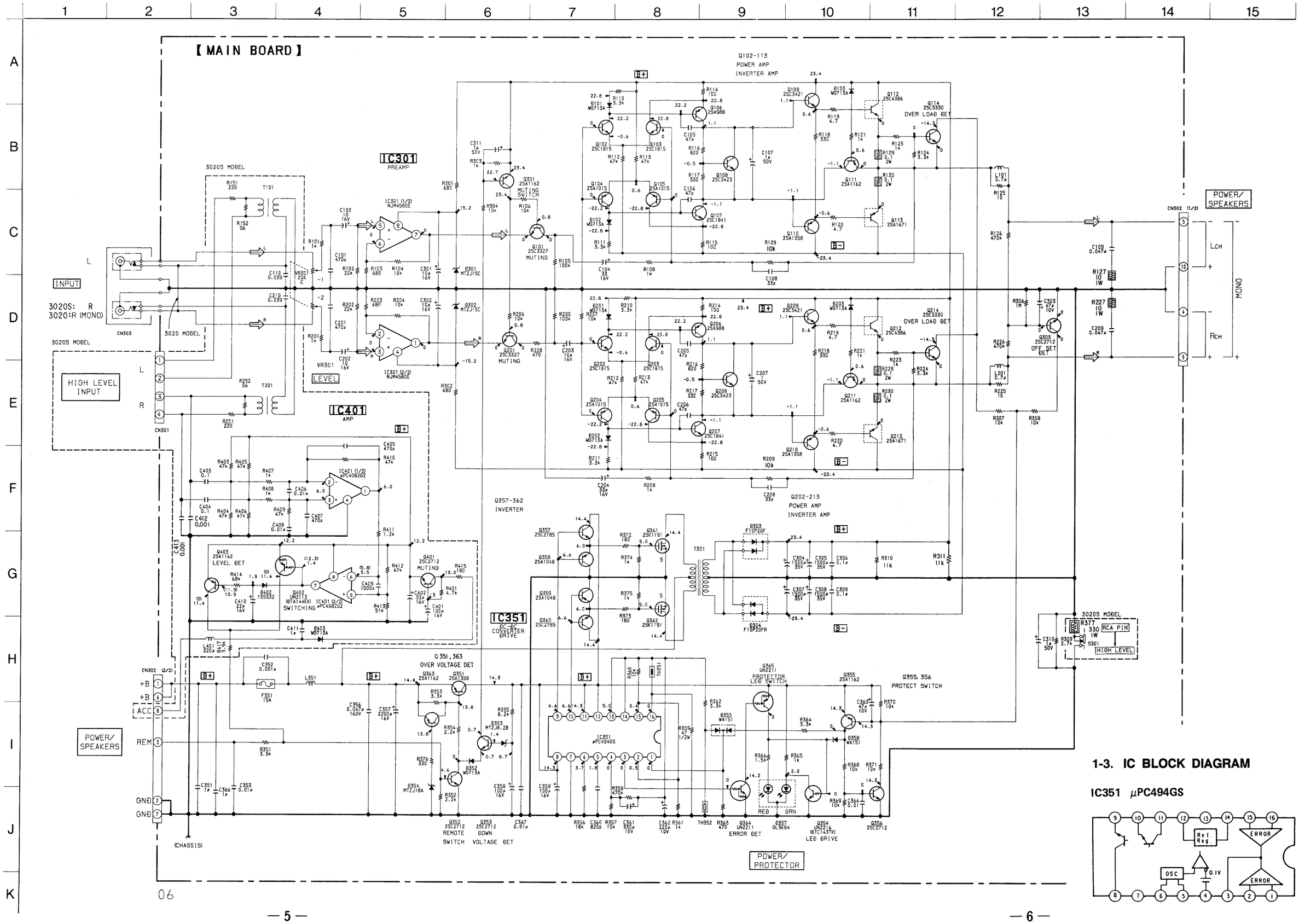
- ○—— : parts extracted from the component side.

Note on Schematic Diagram:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼W or less unless otherwise specified.
- FW : nonflammable resistor.
- B+ : B+ Line.
- Power voltage is dc 14.4V and fed with regulated dc power supply from external power voltage terminal (CN302).
- Voltage and waveforms are dc with respect to ground under no -signal conditions.
  no mark : REMOTE ON.
  ( ) : REMOTE OFF.
- Voltages are taken with a VOM. (Input impedance 10MΩ)
  Voltage variations may be noted due to normal production tolerances.
- Signal path.
  ⇨L : L-ch
  ⇨R : R-ch



1-2. SCHEMATIC DIAGRAM • See Page 3 for Note.



1-3. IC BLOCK DIAGRAM

IC351 μPC494GS

MAIN

2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the part specified in the diagrams or the components used on the set.
- -XX,-X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL : Metal-film resistor
  METAL OXIDE : Metal Oxide-film resistor
  F : nonflammable
- Items marked "＊" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case,u : μ ,for example :
  uA... : μA..., uPA... : μPA...,
  uPB... : μPB..., uPC... : μPC...,
  uPD... : μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH

When indicating parts by reference number, please include the board name.

Ref.No.	Part No.	Description			Remark
*	A-3273-875-A	MAIN BOARD, COMPLETE (3020)			
		**********			
*	A-3273-873-A	MAIN BOARD, COMPLETE (3020S)			
		**********			
	1-533-179-21	HOLDER, FUSE			
*	3-375-657-01	HEAT SINK, SUB			
	7-682-549-04	SCREW (WASHER)			
	7-682-648-09	SCREW (+BVW)(3X8)(SN), TAPPING			
	7-685-646-79	SCREW +P 3X8 TYPE2 NON-SLIT			
		< CAPACITOR >			
C101	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C102	1-126-059-11	ELECT	10uF	20%	50V
C104	1-124-034-51	ELECT	33uF	20%	16V
C105	1-162-215-31	CERAMIC	47PF	5%	50V
C106	1-162-215-31	CERAMIC	47PF	5%	50V
C107	1-124-791-11	ELECT	1.0uF	20%	100V
C108	1-107-159-00	MICA	33PF	5%	500V
C109	1-136-161-00	FILM	0.047uF	5%	50V
C110	1-162-587-11	CERAMIC CHIP	0.039uF	10%	25V (3020S)
C201	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C202	1-126-059-11	ELECT	10uF	20%	50V
C203	1-126-059-11	ELECT	10uF	20%	50V
C204	1-124-034-51	ELECT	33uF	20%	16V
C205	1-162-215-31	CERAMIC	47PF	5%	50V
C206	1-162-215-31	CERAMIC	47PF	5%	50V
C207	1-124-791-11	ELECT	1.0uF	20%	100V
C208	1-107-159-00	MICA	33PF	5%	500V
C209	1-136-161-00	FILM	0.047uF	5%	50V
C210	1-162-587-11	CERAMIC CHIP	0.039uF	10%	25V (3020S)
C301	1-126-059-11	ELECT	10uF	20%	50V
C302	1-126-059-11	ELECT	10uF	20%	50V
C303	1-124-126-00	ELECT	47uF	20%	10V
C304	1-126-306-51	ELECT	1500uF	20%	35V

Ref.No.	Part No.	Description			Remark
C305	1-126-306-51	ELECT	1500uF	20%	35V
C306	1-136-165-00	FILM	0.1uF	5%	50V
C307	1-126-306-51	ELECT	1500uF	20%	35V
C308	1-126-306-51	ELECT	1500uF	20%	35V
C309	1-136-165-00	FILM	0.1uF	5%	50V
C310	1-124-903-11	ELECT	1uF	20%	50V
C311	1-124-903-11	ELECT	1uF	20%	50V
C351	1-162-638-11	CERAMIC CHIP	1uF		16V
C352	1-163-205-00	CERAMIC CHIP	0.001uF	5%	50V
C353	1-163-059-00	CERAMIC CHIP	0.01uF	10%	50V
C356	1-136-961-11	FILM	0.047uF	10%	160V
C357	1-128-531-11	ELECT	2200uF	20%	16V
C358	1-126-101-11	ELECT	100uF	20%	16V
C359	1-126-101-11	ELECT	100uF	20%	16V
C360	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C361	1-124-604-00	ELECT	330uF	20%	10V
C362	1-126-176-11	ELECT	220uF	20%	10V
C363	1-124-126-00	ELECT	47uF	20%	10V
C364	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C366	1-162-638-11	CERAMIC CHIP	1uF		16V
C367	1-163-059-00	CERAMIC CHIP	0.01uF	10%	50V
C401	1-126-101-11	ELECT	100uF	20%	16V (3020S)
C402	1-124-034-51	ELECT	33uF	20%	16V (3020S)
C403	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V (3020S)
C404	1-163-077-00	CERAMIC CHIP	0.1uF	10%	25V (3020S)
C405	1-163-133-00	CERAMIC CHIP	470PF	5%	50V (3020S)
C406	1-164-232-11	CERAMIC CHIP	0.01uF		50V (3020S)
C407	1-163-133-00	CERAMIC CHIP	470PF	5%	50V (3020S)
C408	1-164-232-11	CERAMIC CHIP	0.01uF		50V (3020S)
C409	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V (3020S)
C410	1-126-233-11	ELECT	22uF	20%	50V (3020S)
C411	1-162-638-11	CERAMIC CHIP	1uF		16V (3020S)
C412	1-163-025-11	CERAMIC CHIP	0.001uF		50V (3020S)
C413	1-163-025-11	CERAMIC CHIP	0.001uF		50V (3020S)

MAIN

Ref.No.	Part No.	Description	Remark
		< CONNECTOR >	
* CN301	1-691-785-11	PIN, CONNECTOR (PC BOARD) 4P (HIGH LEVEL INPUT) (3020S)	
* CN302	1-691-786-11	PIN, CONNECTOR (PC BOARD) 10P (POWER/SPEAKERS)	
CN303	1-580-281-11	JACK, PIN 2P (INPUT)	
		< DIODE >	
D101	8-719-911-19	DIODE 1SS119	
D102	8-719-911-19	DIODE 1SS119	
D103	8-719-911-19	DIODE 1SS119	
D201	8-719-911-19	DIODE 1SS119	
D202	8-719-911-19	DIODE 1SS119	
D203	8-719-911-19	DIODE 1SS119	
D301	8-719-110-42	DIODE RD15ES-B3	
D302	8-719-110-42	DIODE RD15ES-B3	
D303	8-719-210-30	DIODE F10P20F(R)	
D304	8-719-210-38	DIODE F10P20FR	
D352	8-719-911-19	DIODE 1SS119	
D353	8-719-921-63	DIODE MTZJ-7.5B	
D354	8-719-107-13	DIODE RD18M-B1	
D355	8-719-400-18	DIODE MA152WK	
D357	8-719-989-31	LED GL9ED4 (POWER/PROTECTOR)	
D358	8-719-400-18	DIODE MA152WK	
D402	8-719-976-31	DIODE 1SS332 (3020S)	
D403	8-719-911-19	DIODE 1SS119 (3020S)	
		< FUSE >	
F351	1-532-982-11	FUSE (BRADE TYPE) (AUTO FUSE) (15A)	
		< IC >	
IC301	8-759-711-82	IC NJM4580E	
IC351	8-759-144-88	IC uPC494GS	
IC401	8-759-103-09	IC uPC4082G2 (3020S)	
		< JUMPER RESISTOR >	
JR301	1-216-296-00	METAL CHIP 0 5%	1/8W
JR302	1-216-296-00	METAL CHIP 0 5%	1/8W
JR303	1-216-295-00	METAL CHIP 0 5%	1/10W
JR304	1-216-296-00	METAL CHIP 0 5%	1/8W
JR305	1-216-295-00	METAL CHIP 0 5%	1/10W
JR306	1-216-296-00	METAL CHIP 0 5%	1/8W
JR308	1-216-296-00	METAL CHIP 0 5%	1/8W
JR309	1-216-296-00	METAL CHIP 0 5%	1/8W
JR310	1-216-296-00	METAL CHIP 0 5%	1/8W
JR311	1-216-296-00	METAL CHIP 0 5%	1/8W
JR312	1-216-295-00	METAL CHIP 0 5%	1/10W
JR313	1-216-295-00	METAL CHIP 0 5%	1/10W
JR314	1-216-296-00	METAL CHIP 0 5%	1/8W
JR315	1-216-296-00	METAL CHIP 0 5%	1/8W
JR316	1-216-296-00	METAL CHIP 0 5%	1/8W
JR317	1-216-296-00	METAL CHIP 0 5%	1/8W
JR319	1-216-295-00	METAL CHIP 0 5%	1/10W
JR320	1-216-296-00	METAL CHIP 0 5%	1/8W (3020)
		< COIL >	
L101	1-407-365-00	COIL, CHOKE 0.7uF	
L201	1-407-365-00	COIL, CHOKE 0.7uF	
L351	1-424-638-11	COIL, CHOKE	
L401	1-410-336-11	INDUCTOR 220uH (3020S)	
		< TRANSISTOR >	
Q101	8-729-203-49	TRANSISTOR 2SC3327-B	
Q102	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q103	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q104	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q105	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q106	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q107	8-729-140-84	TRANSISTOR 2SC1841-PAFAEA	
Q108	8-729-203-45	TRANSISTOR 2SC3423-O	
Q109	8-729-207-82	TRANSISTOR 2SC3421-Y	
Q110	8-729-207-89	TRANSISTOR 2SA1358-Y	
Q111	8-729-216-22	TRANSISTOR 2SA1162-G	
Q112	8-729-321-40	TRANSISTOR 2SC4386-Y	
Q113	8-729-321-37	TRANSISTOR 2SA1671-Y	
Q114	8-729-820-24	TRANSISTOR 2SC3330-T	
Q201	8-729-203-49	TRANSISTOR 2SC3327-B	
Q202	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q203	8-729-281-52	TRANSISTOR 2SC1815-Y	
Q204	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q205	8-729-201-53	TRANSISTOR 2SA1015-GR	
Q206	8-729-140-82	TRANSISTOR 2SA988-PAFAEA	
Q207	8-729-140-84	TRANSISTOR 2SC1841-PAFAEA	
Q208	8-729-203-45	TRANSISTOR 2SC3423-O	
Q209	8-729-207-82	TRANSISTOR 2SC3421-Y	
Q210	8-729-207-89	TRANSISTOR 2SA1358-Y	
Q211	8-729-216-22	TRANSISTOR 2SA1162-G	
Q212	8-729-321-40	TRANSISTOR 2SC4386-Y	
Q213	8-729-321-37	TRANSISTOR 2SA1671-Y	
Q214	8-729-820-24	TRANSISTOR 2SC3330-T	
Q301	8-729-216-22	TRANSISTOR 2SA1162-G	
Q303	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q351	8-729-207-89	TRANSISTOR 2SA1358-Y	
Q352	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q353	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q354	8-729-900-98	TRANSISTOR DTC143TK	
Q355	8-729-216-22	TRANSISTOR 2SA1162-G	
Q356	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q357	8-729-119-78	TRANSISTOR 2SC2785-HFE	

Ref.No.	Part No.	Description			Remark
Q358	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q359	8-729-119-76	TRANSISTOR	2SA1175-HFE		
Q360	8-729-119-78	TRANSISTOR	2SC2785-HFE		
Q361	8-729-322-52	TRANSISTOR	2SK1191		
Q362	8-729-322-52	TRANSISTOR	2SK1191		
Q363	8-729-216-22	TRANSISTOR	2SA1162-G		
Q364	8-729-421-22	TRANSISTOR	UN2211		
Q365	8-729-901-46	TRANSISTOR	DTA144EK		
Q401	8-729-230-49	TRANSISTOR	2SC2712-YG		(3020S)
Q402	8-729-901-46	TRANSISTOR	DTA144EK		(3020S)
Q403	8-729-216-22	TRANSISTOR	2SA1162-G		(3020S)
		< RESISTOR >			
R101	1-259-428-11	CARBON	1K	5%	1/6W
R102	1-259-460-11	CARBON	22K	5%	1/6W
R103	1-247-711-11	CARBON	680	5%	1/4W
R104	1-247-725-11	CARBON	10K	5%	1/4W
R105	1-259-476-11	CARBON	100K	5%	1/6W
R106	1-216-073-00	METAL CHIP	10K	5%	1/10W
R108	1-259-428-11	CARBON	1K	5%	1/6W
R109	1-247-725-11	CARBON	10K	5%	1/4W
R110	1-259-440-11	CARBON	3.3K	5%	1/6W
R111	1-259-440-11	CARBON	3.3K	5%	1/6W
R112	1-259-468-11	CARBON	47K	5%	1/6W
R113	1-259-468-11	CARBON	47K	5%	1/6W
R114	1-259-404-11	CARBON	100	5%	1/6W
R115	1-259-404-11	CARBON	100	5%	1/6W
R116	1-259-426-11	CARBON	820	5%	1/6W
R117	1-259-416-11	CARBON	330	5%	1/6W
R118	1-247-706-11	CARBON	330	5%	1/4W
R119	1-260-263-11	CARBON	4.7	5%	1/4W
R120	1-260-263-11	CARBON	4.7	5%	1/4W
R121	1-216-198-00	METAL CHIP	1K	5%	1/8W
R123	1-216-198-00	METAL CHIP	1K	5%	1/8W
R124	1-216-210-00	METAL GLAZE	3.3K	5%	1/8W
R125	1-249-504-11	CARBON	10	5%	1/4W
R126	1-216-262-00	METAL GLAZE	470K	5%	1/8W
R127	1-215-857-11	METAL OXIDE	10	5%	1W F
R129	1-217-611-00	RES, METAL PLATE 0.1			2W
R130	1-217-611-00	RES, METAL PLATE 0.1			2W
R151	1-247-704-11	CARBON	220	5%	1/4W (3020S)
R152	1-249-522-11	CARBON	56	5%	1/4W (3020S)
R201	1-259-428-11	CARBON	1K	5%	1/6W
R202	1-259-460-11	CARBON	22K	5%	1/6W
R203	1-247-711-11	CARBON	680	5%	1/4W
R204	1-247-725-11	CARBON	10K	5%	1/4W
R205	1-259-476-11	CARBON	100K	5%	1/6W
R206	1-216-073-00	METAL CHIP	10K	5%	1/10W
R207	1-259-452-11	CARBON	10K	5%	1/6W

Ref.No.	Part No.	Description			Remark
R208	1-259-428-11	CARBON	1K	5%	1/6W
R209	1-247-725-11	CARBON	10K	5%	1/4W
R210	1-259-440-11	CARBON	3.3K	5%	1/6W
R211	1-259-440-11	CARBON	3.3K	5%	1/6W
R212	1-259-468-11	CARBON	47K	5%	1/6W
R213	1-259-468-11	CARBON	47K	5%	1/6W
R214	1-259-404-11	CARBON	100	5%	1/6W
R215	1-259-404-11	CARBON	100	5%	1/6W
R216	1-259-426-11	CARBON	820	5%	1/6W
R217	1-259-416-11	CARBON	330	5%	1/6W
R218	1-247-706-11	CARBON	330	5%	1/4W
R219	1-260-263-11	CARBON	4.7	5%	1/4W
R220	1-260-263-11	CARBON	4.7	5%	1/4W
R221	1-216-198-00	METAL CHIP	1K	5%	1/8W
R223	1-216-198-00	METAL CHIP	1K	5%	1/8W
R224	1-216-210-00	METAL GLAZE	3.3K	5%	1/8W
R225	1-249-504-11	CARBON	10	5%	1/4W
R226	1-216-262-00	METAL GLAZE	470K	5%	1/8W
R227	1-215-857-11	METAL OXIDE	10	5%	1W F
R228	1-247-708-11	CARBON	470	5%	1/4W
R229	1-217-611-00	RES, METAL PLATE 0.1			2W
R230	1-217-611-00	RES, METAL PLATE 0.1			2W
R251	1-247-704-11	CARBON	220	5%	1/4W (3020S)
R252	1-249-522-11	CARBON	56	5%	1/4W (3020S)
R301	1-247-711-11	CARBON	680	5%	1/4W
R302	1-247-711-11	CARBON	680	5%	1/4W
R303	1-216-049-00	METAL CHIP	1K	5%	1/10W
R304	1-216-073-00	METAL CHIP	10K	5%	1/10W
R306	1-216-270-00	METAL GLAZE	1M	5%	1/8W
R307	1-216-222-00	METAL GLAZE	10K	5%	1/8W
R308	1-216-222-00	METAL GLAZE	10K	5%	1/8W
R309	1-247-718-11	CARBON	2.7K	5%	1/4W
R310	1-216-074-00	METAL CHIP	11K	5%	1/10W
R311	1-216-074-00	METAL CHIP	11K	5%	1/10W
R351	1-216-212-00	METAL GLAZE	3.9K	5%	1/8W
R352	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R353	1-216-210-00	METAL GLAZE	3.3K	5%	1/8W
R354	1-216-206-00	METAL GLAZE	2.2K	5%	1/8W
R355	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R356	1-216-079-00	METAL CHIP	18K	5%	1/10W
R357	1-216-073-00	METAL CHIP	10K	5%	1/10W
R358	1-216-262-00	METAL GLAZE	470K	5%	1/8W
R359	1-260-083-11	CARBON	47	5%	1/2W
R360	1-216-073-00	METAL CHIP	10K	5%	1/10W
R361	1-216-049-00	METAL CHIP	1K	5%	1/10W
R362	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R363	1-216-041-00	METAL CHIP	470	5%	1/10W
R364	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R365	1-216-198-00	METAL CHIP	1K	5%	1/8W
R366	1-216-202-00	METAL GLAZE	1.5K	5%	1/8W

MAIN

Ref.No.	Part No.	Description			Remark
R368	1-216-073-00	METAL CHIP	10K	5%	1/10W
R369	1-216-073-00	METAL CHIP	10K	5%	1/10W
R370	1-216-073-00	METAL CHIP	10K	5%	1/10W
R371	1-216-073-00	METAL CHIP	10K	5%	1/10W
R372	1-259-410-11	CARBON	180	5%	1/6W
R373	1-259-410-11	CARBON	180	5%	1/6W
R374	1-259-428-11	CARBON	1K	5%	1/6W
R375	1-259-428-11	CARBON	1K	5%	1/6W
R376	1-216-037-00	METAL CHIP	330	5%	1/10W
R377	1-215-866-11	METAL OXIDE	330	5%	1W F (3020S)
R401	1-216-065-00	METAL CHIP	4.7K	5%	1/10W(3020S)
R403	1-216-691-11	METAL CHIP	47K	0.5%	1/10W(3020S)
R404	1-215-461-00	METAL	47K	1%	1/6W (3020S)
R405	1-216-691-11	METAL CHIP	47K	0.5%	1/10W(3020S)
R406	1-215-461-00	METAL	47K	1%	1/6W (3020S)
R407	1-216-049-00	METAL CHIP	1K	5%	1/10W(3020S)
R408	1-216-049-00	METAL CHIP	1K	5%	1/10W(3020S)
R409	1-216-089-00	METAL CHIP	47K	5%	1/10W(3020S)
R410	1-216-089-00	METAL CHIP	47K	5%	1/10W(3020S)
R411	1-216-051-00	METAL CHIP	1.2K	5%	1/10W(3020S)
R412	1-215-461-00	METAL	47K	1%	1/6W (3020S)
R413	1-216-692-11	METAL CHIP	51K	0.5%	1/10W(3020S)
R414	1-216-093-00	METAL CHIP	68K	5%	1/10W(3020S)
R415	1-259-410-11	CARBON	180	5%	1/6W (3020S)
R417	1-216-212-00	METAL GLAZE	3.9K	5%	1/8W (3020S)
		< SWITCH >			
S301	1-570-358-11	SWITCH, SLIDE (HIGH LEVEL/RCA PIN) (3020S)			
		< TRANSFORMER >			
T101	1-423-272-11	TRANSFORMER, INPUT (3020S)			
T201	1-423-272-11	TRANSFORMER, INPUT (3020S)			
T301	1-450-843-11	TRANSFORMER, DC-DC CONVERTER			
		< THERMISTOR >			
TH351	1-808-779-11	THERMISTOR			
TH352	1-809-664-31	THERMISTOR, POSITIVE			
		< VARIABLE RESISTOR >			
VR301	1-238-817-11	RES, VAR, CARBON 20K/20K (LEVEL)			

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